TEMPERATURES IN NEW YORK SUBWAYS.

Through the courtesy of Mr. D. L. Turner, Chief Engineer, Transit Construction Commissioner, State of New York, thirteen prints were obtained showing the temperatures in New York subways, 1904–1917. The most interesting two are reproduced as figures 1 and 2.

Figure 1 shows strikingly the effect of operation on the temperature, the temperatures during operation averaging 11° to 20° F. higher than those before operation. Can this be due to the combined effect of human and mechanical heat? Before operation the average temperature, about 54° F. nearly coincides, as would be expected, with the mean annual air temperature of New York, 52° F. The range of the average temperature, 39° to 69° F., is only two-thirds the range of mean monthly air temperature at New York City.

Figure 2 attests to the efficient ventilation of the subways. Cold days outside are cold days in the subways and warm days are warm outside and in. The temperature variability, is, necessarily, less than half as great in the subways as outside.—*C. F. B.*

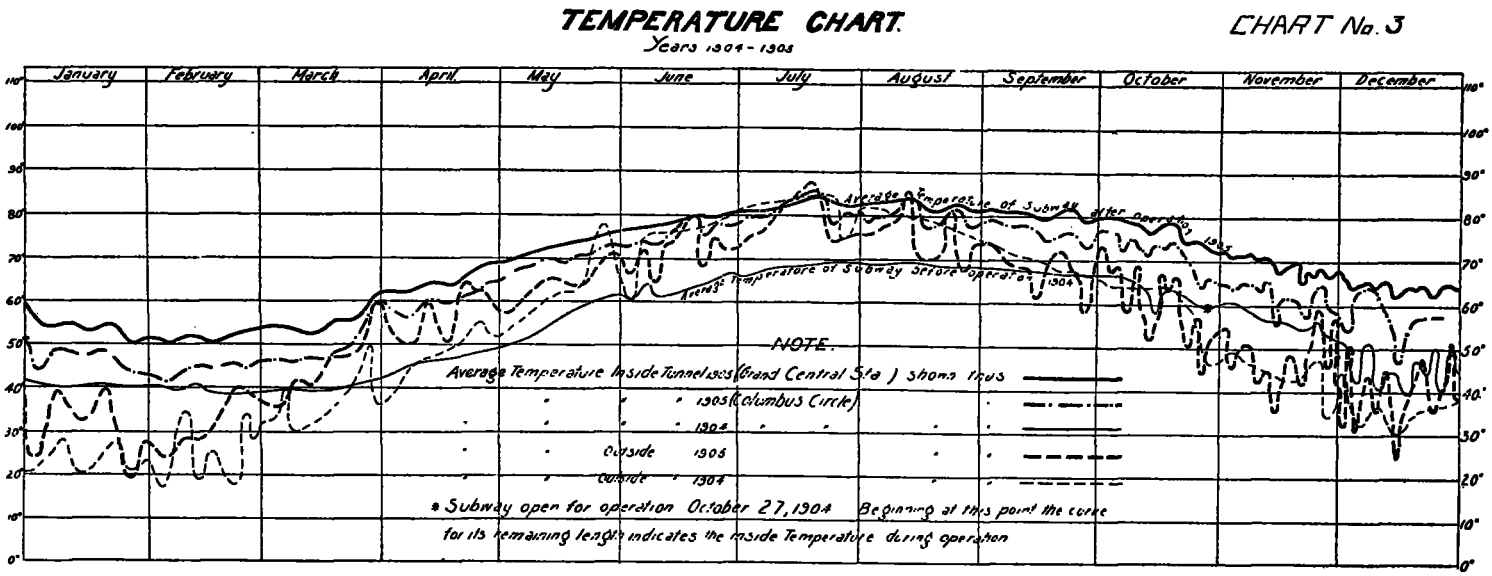

FIG. 1.—This chart is designed to show, in a general way, the relative variations in temperature inside and outside of tunnel for the years 1904 and 1905, with the particular object of showing the changes inside the tunnel resulting from the operation of trains. The thermometer at Columbus Circle is at the south end of west platform, while that at Grand Central Station is about 70 feet west of south-bound-train platform, between south-bound local and express tracks, and gives the approximate average temperature throughout the subway at stations and intermediate points.

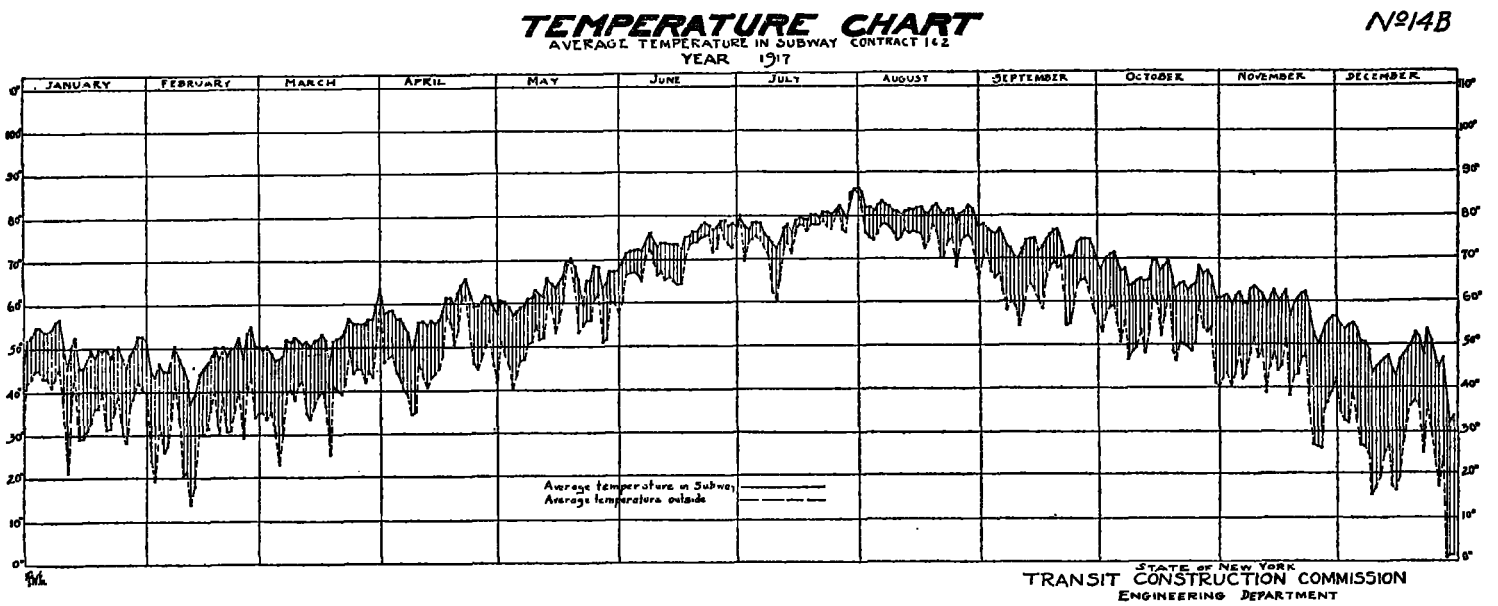

FIG. 2.—Average 1917 daily air temperatures outside and in the Manhattan-Bronx & Brooklyn subways covered by contracts 1 and 2.

AN ICE MINE THAT FREEZES IN SUMMER AND MELTS IN WINTER.

By C. A. VANDERMUELEN.

[Reprinted from Sci. Am., May 6, 1916, pp. 470 and 495.]

NOTE.—The following account draws attention to a striking effect of the slowness with which the annual temperature wave goes into the ground.—ED.

"It was discovered some 18 years ago by a farmer who, noting a peculiar coldness—even in the warmest weather—of a certain portion of his farm, was led to dig there in the belief that he would find a deposit of silver. [Near Coudersport, Pa.] The mine or cave which he unearthed proved to be 40 feet deep and from 10 to 12 feet in diameter. At present it is entered by

means of a ladder, since it is situated on the side of hill. * * * The ice is formed from a peculiar cold mist which comes through openings found all the way from the top to the bottom of the 40-foot shaft. As soon as the warm weather arrives frost appears on the walls of the shaft and soon tiny icicles form rapidly, until in the warmest weather huge icicles, often 2 feet thick, reach from the platform at the top, to the bottom of the mine. The ice begins forming in May, and in October the thaw sets in. A shelter was erected over the mine some time ago; but it had to be removed because the ice melted. * * * The mine has been used as a cold storage plant by the wife of the farmer, and she claims that eggs have been kept seven months in the natural refrigerator and at the end of that period found to be in perfect condition. During the summer the temperature of the mine ranges from 25° to 30° F. above zero. This mine, [in winter] notwithstanding the fact that it is open at the top, is warm enough to keep vegetables without freezing."

FORECASTING TIDE STAGES IN THE HARBOR AT PORTLAND, OREG.

EDWARD LANSING WELLS, Meteorologist.

[Dated: Weather Bureau, Portland, Oreg., Oct. 16, 1919.]

The ebb and flow of the tide affect the stage of water in the Columbia River for some distance above the mouth of the Willamette, probably as far as Cascade Locks, and at times affect the stage of the Willamette to the foot of the falls at Oregon City. Cascade Locks is about 150 miles from the mouth of the Columbia, and Oregon City is about 120 miles.

The zero of the river gage at Portland is less than 1 foot above mean sea level. The maximum range of the tide at Astoria, 99 miles below Portland, is about 12 feet. The maximum range of the tide at Portland is between 3.5 and 4 feet. When the river at Portland stands at 9

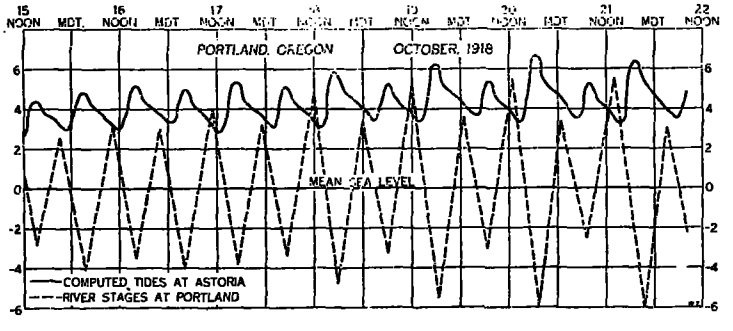

FIG. 1.—Tides in the Columbia River, Oct. 15-22, 1918.

feet or higher, the tide effect is seldom noticeable. Figure 1 shows graphically the rise and fall of the river during a typical week. It will be seen that, owing to the fact that the time required for the tide to travel from Astoria to Portland is nearly equal to the interval between the high and low tides, the actual water level at Astoria is occasionally higher than at Portland. This condition is apparently never sufficiently pronounced to cause a reversal or even a cessation of the current in the Columbia, but at low-water stages there is a noticeable reversal of the current in the lower reaches of the Willamette.

During settled weather, when the normal stage of water in the Columbia and Willamette is low, as during the late summer and early fall of 1918 and 1919, it has been found that high tide at Portland occurs about 6 hours later than at Astoria, and that the maximum stage at Portland, based on the zero of the river gauge, will be about 45 per cent to 55 per cent of the computed stage at Astoria, based on mean lower low water, which is the datum used in current tide tables. Figure 2 shows the relation for the month of October, 1918.

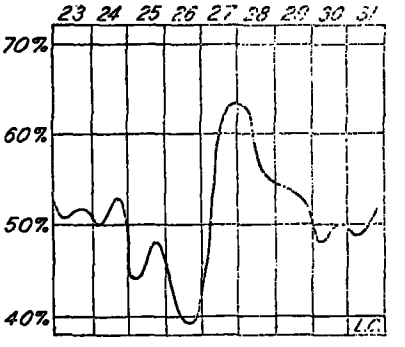

FIG. 2.—Relation of tide at Portland to computed tide at Astoria, Oct. 23-31, 1918.

However, when high winds occur along or near the coast, the actual stages at Astoria vary considerably from the computed tides, and at such times accurate predictions for Portland can not be made. Weather maps of October 25–27, indicate an increasing pressure gradient that favored on-shore gales attending the extreme variation that occurred on October 26 and 27, as indicated in figure 2. It appears that as the storm approaches, the offshore winds hold the water back; later, as the storm advances, the winds change, piling the water up. This heaping up of the water is doubtless due more to the action of winds well out to sea than to winds along the immediate coast.

Arrangements were made to install a recording tide gauge at Astoria, for use in this connection, but conditions arising after the close of the war made this impracticable

BAROMETRIC PRESSURE, WINDS, AND STORMS OF THE PACIFIC OCEAN.[1]

By EDWARD A. BEALS.

[Abstract.]

In January there are two areas of high pressure centered, respectively, midway between Honolulu and San Francisco and off the coast of Chile, and three areas of low pressure centered over the Aleutian Islands, the south polar regions, and Australia. In July the Aleutian LOW disappears and there is a HIGH over Australia. These formations are subject to seasonal variations in position and magnitude, because of the shifting apparent position of the sun in the heavens. They are caused by the familiar inequality of the heating of the land and water areas, and by dynamical causes inherent in the planetary circulation.

The usual system of spirally flowing winds surrounds these formations. The proximity of the North Pacific HIGH to the American coast is the cause of the rainless

[1] Presented at the Pasadena meeting of the A. A. A. S., June, 1919. Published in full by University of California Press, 1920.